BIO TECHNOLOGIES

Excellence in Engineering Reliability

BIO-X Profile

Bio-X Technologies provides a range of engineering services encompassing production support, turn-around maintenance and management services geared towards supporting the full lifecycle of oil and gas facilities, petrochemical plants and the power generation industry.

With access to expertise in primary disciplines and a strong engineering network, we deliver creative, smart and functional solutions to our Clients. Our engineering strengths combine innovation with tradition.

Through our operations and in our research and development, we are committed to providing our Clients with systems integration technology services, products and solutions.

Maintaining a good balance between oil & gas developments and later-cycle production support as well as developing long-term Client relationships through performance-based contracts is the key to optimising performance for cost efficient, safe and reliable project delivery.

Bio-X offers a comprehensive range of maintenance engineering solutions to ensure the achievement of performance targets, which includes the: -

- Application of maintenance criteria at the design stage;
- Preparation of maintenance policies and philosophies; and
- Development of complete maintenance strategies based on reliability centred techniques.

Our extensive experience in piping and pipeline services topside, subsea and underground over the last 10 years has enabled us to provide the best inspection, repair and maintenance solutions to ensure system Fitness-for-Service.

One of the major features of our success with Clients such as ExxonMobil and Shell has been meeting and exceeding the Oil and Gas Industry's most stringent procedures and safety requirements for Tank Cleaning.

Our Services include the following : -

- Tank Cleaning and Desludging
- Piping and Pipeline Inspection and Maintenance
- Hydrostatic Pressure Testing
- Corrosion Inhibition and Chemical Injection Packages
- Design, Engineering, Fabrication, Installation and Commissioning of Piping, Pipelines and Storage Tanks
- Offshore and Onshore Piping, Pipeline, Structure and Marine Terminal Maintenance Services
- SBM, SLAM, PLEM, CALM and CBM Specialist Maintenance

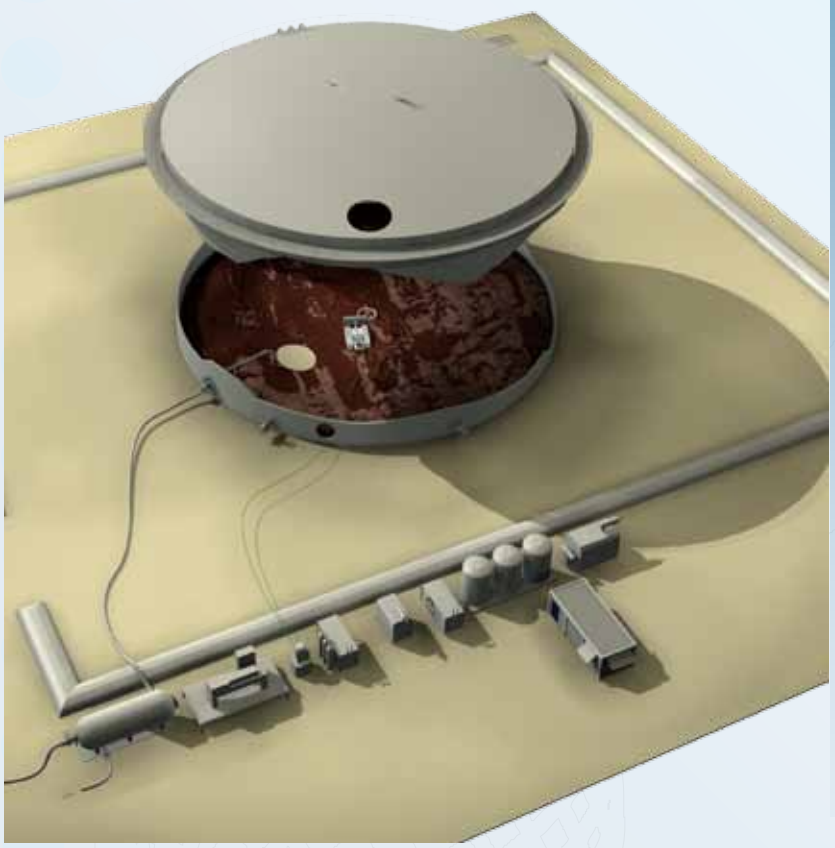
Bio-X has built a reputation for safety and integrity with an excellent operational track record. Our HSE Processes are carried out in accordance to ISO14001:20004. Health and Safety is BIO-X's number one core value. Our safety culture has enabled us to maintain consistently high safety standards at locations worldwide.

Storage Tank Cleaning

Bio-X Technologies Complete Tank Cleaning and Oil Recovery System (Bio-XORS) has been designed to maximise recovery of valuable resalable oil fractions from tank bottom sludge thereby minimising the volume of disposable residual bottom sludge.

Our cleaning systems are suitable for both floating and fixed-roof tanks with tank volumes of up to 160,000m3 (1,000,000bbls) with sludge contents easily exceeding 10,000m3 (65,000bbls) and can be used to clean crude oil, heavy fuel oil, catalytic cracker residue (CCR) slop oil and Low Sulfur Waxy Residue (LSWR) bottom sludge. Tank cleaning and oil recovery operations are conducted simultaneously.

Storage Tank Cleaning Equipment Arrangement



Typical Tank

Sludge build up includes ashphaltenes, waxes, parrifins and other carbon matter.
The equipment is modularised, enabling straightforward transportation and optimum manoeuvrability. The system includes modules for Suction, Recirculation,Skimming and Separation. Other optional auxiliary units such as an office/lab container, inert gas generator, and steam and power generator are available.

BIO-XORS™ Process – Complete Tank Cleaning And Oil Recovery Solution

Every oil storage tank is unique and requires different approaches to maximise the removal of bottom sludge within the shortest possible time. In order to ensure optimised operations, prior to the cleaning of any tank, sludge sampling and profiling activities are carried out. Proprietary software specially developed for sludge profiling displays 3D images of sludge distribution profiles providing an indication of residue quantities.

Sludge sampling is carried out to determine product characteristics providing estimates of the amount of recoverable hydrocarbon as well as residual unusable sludge.
The Bio-XORS™ Process can be carried out as a No-Man-Entry, 24-hour continuous operation until the final cleaning stage.

All equipment is installed within Client and location specific designated safe working zones. Equipment installed within the hazardous zones is either hydraulic or pneumatic powered. All lighting required for the work is ATEX certified for Class 1 Div. 1 areas.

Utilising environmentally-friendly technology with continuous monitoring of performance, adjustments to the process can be made to ensure optimised removal of sludge and recovery of usable hydrocarbon fractions.

During the tank cleaning activities, all necessary precautions are taken to ensure zero emissions and hydrocarbon spills.

The main advantages of the Bio-XORS™ Process are:

- The downtime of the tank is reduced
- On site recovery of the usable or workable hydrocarbons present in the sludge; i.e. those with specifications which are compatible with the Client's specifications
- Significant reduction of the quantities of sludge to be disposed of at the landfill or to be made inert. The waste volume to be disposed to landfill is significantly reduced to less than 20% of the original volume
- No use of secondary tanks
- No works on the tank roof (except for ventilation as per Client requirements)
- High environmental compatibility
- Greater safety of tank cleaning operations compared to other process, as the operations are mainly carried out externally (from outside the tank)
- Negligible environmental impact both at a visual level and in relation to atmospheric emissions and contamination of the area
- Use of natural products with biosurfactants origin for the final cleaning stage (as approved by the Client)

Process Flow Description

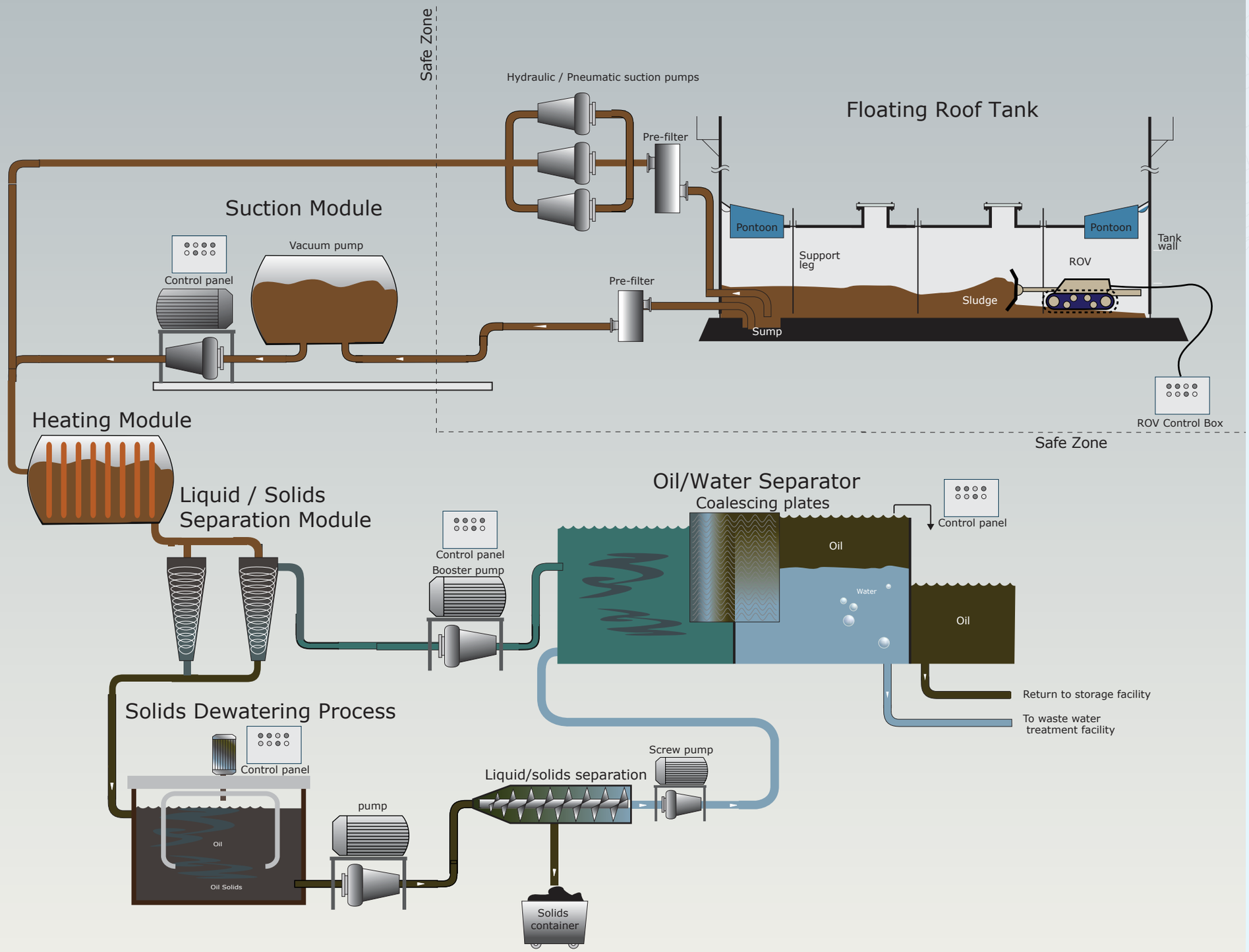
1. The cleaning process starts with desludging with suction hoses and pumps as well as the deployment of a TankROV. Depending on the nature and complexity of the sludge, it may be necessary to add cutter stock to enable the sludge to be pumped out of the tank.

2. The sludge is heated and run through desanders and desilters. Liquids are then further separated in an oil water separator. Recovered oil is returned to Client storage facilities.

3. Should the sludge require further treatment diluents are added into the solids dewatering process for further separation of the liquids from the sludge solids.

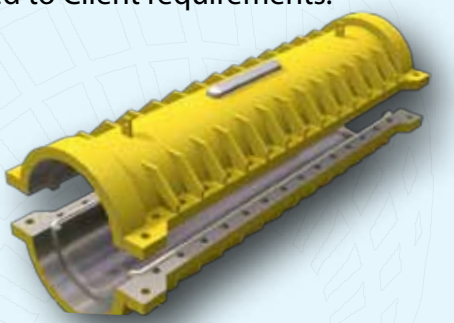
4. After completion of the process, all wastewater is drained to Client effluent/ wastewater treatment facilities or treated to meet regulatory standards for disposal. Solids are packaged for disposal as per Client and regulatory requirements.

BIO-XORS™ Process – Complete Tank Cleaning and Oil Recovery Solution
Shematic Diagram



Pipeline and Piping Services

Bio-X Technologies offers a full range of services from cleaning to inspection and maintenance of piping, risers and pipelines as well as Risk Based Inspection (RBI) programmes and Fitness-for-Service (FFS) evaluations specifically tailored to Client requirements. Our services include: -



1. Inspection Systems (PIPS)
   - Phase Array Ultrasonic Testing(PAUT);
   - Long Range Ultrasonic Testing (LRUT);
   - Corrosion Under Insulation (CUI) Inspection;
   - Tethered Pig Inspection;
   - Remote Field Testing (RFT) pigging;
   - Ultrasonic (UT) and Magnetic Flux Leakage (MFL) pigging

2. Permanent and Temporary Repair Systems
   - Composite Repair Systems (PiPCReS)
     - Piping and Pipeline Composite Repair Solutions
   - Permanent Split Repair Sleeve Systems (PiPSReS)
     - Split Repair Sleeves
     - Welded Repair Sleeves
     - Bolted Repair Sleeves

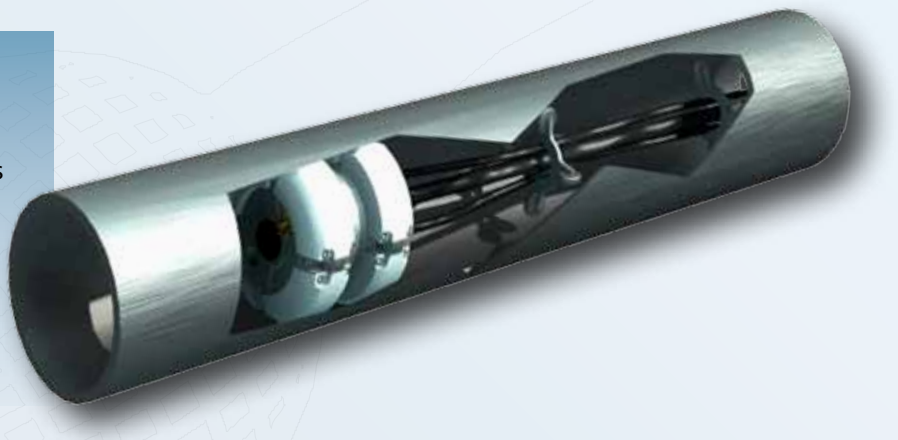
Piping and Pipeline Inspection Systems (PiPS)

Bio-X Technologies Piping and Pipeline Inspection Systems (PiPS) covers a complete range of services for high-resolution and quality defect identification utilizing Geometry, MFL, UT, EMAT, EC and AE technology for piping and pipeline sizes ranging from 4" to 64".

Inspection can be carried out on carbon steel, stainless steel, high density polyethylene (HDPE) or concrete pipe material, which may be bare, coated or insulated with any material and located either above ground, underground or subsea.

Our pipeline integrity management and monitoring teams comprise of pipeline professionals, corrosion experts, independent verification processes and API 570 Certified Piping Inspectors.

Bio-X Technologies PiPS specialises in the inspection of 'unpiggable' pipelines comprising pipelines with no launching or receiving facilities, which traditionally have been deemed 'unpiggable'.



Piping and Pipeline Permanent and Temporary Repair Systems

Bio-X Technologies Piping and Pipeline Composite Repair Systems (PiPCReS) offers a combination of leading temporary and composite piping and pipeline repair solutions.

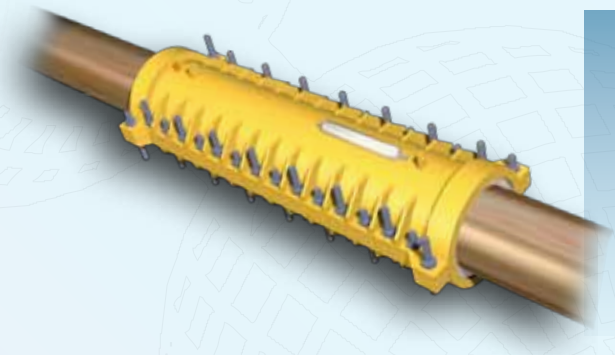
Repairs can be carried out on elbows, tees, reducers, nozzles and other pipe components. The flexible repair technique allows materials to be tailored on-site to enable repair of complex geometrical shapes commonly found in pipe systems.

Our systems provide high durability repairs with excellent chemical resistance. Based on high-performance requirements the systems provide protection from external corrosion, replacement of strength for damaged pipes and seal through-hole (leak) defects.

PiPCReS repair systems comprise of high-strength corrosion resistant e-glass, resin composite sleeves high performance adhesives, high-strength filler materials non-woven glass fiber fabrics and epoxy resins.

Each application is designed in accordance with ISO TS 24817, ASME PCC-2 R&T Article 4.1 and API requirements. The system can be used to permanently repair external blunt metal loss defects and can operate at up to 135°C (275°F). Reports can be prepared by our team for each specific application. These can be used to support Engineering Change procedure.

Bio-X Technologies Piping and Pipeline Split Repair Sleeve Systems (PiPSReS) is a comprehensive on-line repair system specifically designed to repair eroded or corroded risers and pipelines in-situ.



Our Split Repair Sleeves are used for making permanent repairs to on-shore and offshore pipelines. Its rugged and reliable design makes it suitable for pipes carrying oil, gas and chemical fluids with high temperatures and with pressures up to 3700 psi (250bar).

All welding procedures for fabrication and field installation are qualified in accordance with ASME sections IX, B31.4 & B31.8, API-1104 and are engineered to suit ANSI 150 to ANSI1500 as well as API requirements. Systems are designed to meet Client requirements regarding pressure, diameter and length.

All radiographic, hydrostatic, mill certificates and necessary supporting documents are supplied prior to delivery and installation. Product Certificates by Det Norske Veritas (DNV) or Lloyds Register may be provided as an additional independent verification or certification for acceptance.

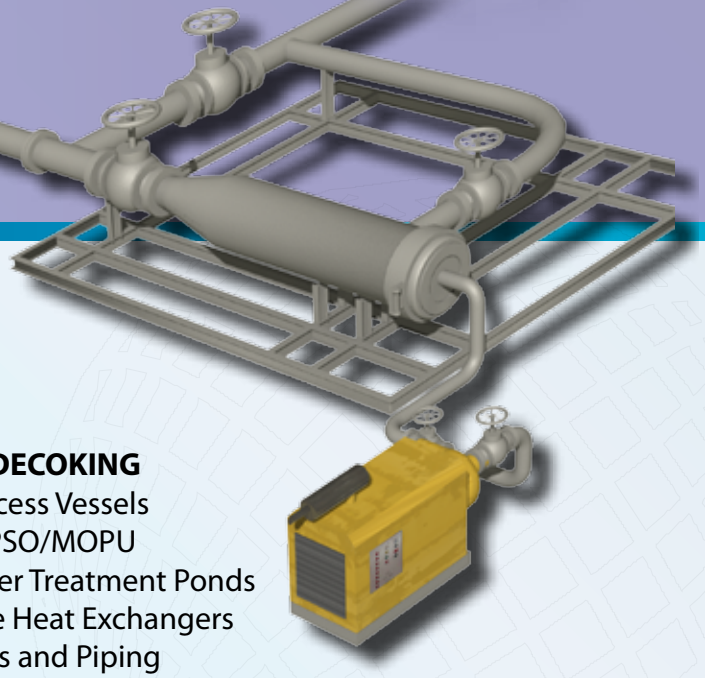
YOUR ASSURANCE IN STRENGTH AND PROTECTION

Lloyd's Register's test certificates can be made available upon request

Bio-X Technologies PiPSReS consists of mating sleeve sections which are bolted or welded together around the damaged and corroded pipe area. Each sleeve is manufactured from the highest quality steel under the strictest quality control procedures. The annulus between the parent pipe and the sleeve is epoxy grouted to assist with load transfers from the corroded parent pipe to the new sleeve.

BIO-X TECHNOLOGIES PRODUCT BRIEF	
BIO – XURFACT	(Malaysian DOE Approved) Surface Washing Agent to remove oil and hydro-carbon based substances without dispersing or solubilising the oil into the water column
BIO – XOLVIT	Dispersant to emulsify, disperse or solubilise oil into the water column
BIO – REM	(Malaysian DOE Approved) Bioremediation Agent consisting of locally selected microbiological cultures, enzyme additives to increase biodegradation rates
BIO – XIDE	Biocide to eliminate sulphate reducing bacteria in crude oil pipelines, process vessels, piping and systems
BIO – XONE	3-in-1 Cocktail consisting of oxygen scavengers, biocide and corrosion inhibitors

Bio-X constantly strives to improve systems and products to achieve better results at a faster rate and is committed to constant research and development to ensure customer satisfaction.



ADDITIONAL SERVICES

DESLUDGING, DESCALING, DECOKING

- Offshore and Onshore Process Vessels
- Petroleum Tankers/FSO/FPSO/MOPU
- Sludge/Effluent/Wastewater Treatment Ponds
- Fin-Fan and Shell and Tube Heat Exchangers
- Pipelines, Flow Lines, Risers and Piping
- Coolers/Towers/Condensers

MECHANICAL REPAIR & MAINTENANCE

- Aboveground Storage Tanks
- Valve Repair and Refurbishment
- Pipeline Launcher and Receiver Facilities Refurbishment
- General Engineering Design and Fabrication Work
- Sub-Sea Repair and Maintenance Support

SUPPLIED BREATHING AIR SYSTEMS

- Testing and Servicing of SCBA/Airlines etc
- Testing and Certification of SCBA Cylinders, Hoses, Regulators etc
- Air Quality Testing and Certification
- Design and Fabrication of Supplied Breathing Air Panels
- Breathing Air Compressor Service and Repair

HYDROSTATIC PRESSURE TESTING

- Pre-Commissioning and Post Repair Testing Of Piping Systems and Pipelines
- Hydrostatic Testing Of Piping Systems and Pressure Vessels
- Hydrostatic, Leak and Function Testing of Air/Gas/SCBA Cylinders
- Leak Detection of Heat Exchanger/Condenser Tubes

OTHER SERVICES

- Corrosion Inhibition and Chemical Injection Packages
- Fire Suppression Systems
- Mercury Containment, Decontamination and Disposal
- Offshore and Onshore Piping/Pipeline Corrosion Prevention Services
- Design, Engineering, Fabrication, Installation and Commissioning of Mechanical, Electrical and Hydraulic Systems
- Pickling and Passivation
- Bioremediation Services